2/8/16

"The will to succeed is important, but what's more important is the will to prepare."-Bobby Knight

HW: "Zero and Negative Exponents" worksheet #3-21 odd, 35-53 odd

AIM: How do we Simplify Rational Expressions?

Warm Up:

Remember: PEMDAS (inside out)

1) Simplify $\left(\frac{x^3y^5}{(xy^2)^2}\right)^2$

$\left(\frac{x^3y^5}{x^2y^4}\right)^2$

$(xy)^2 \rightarrow x^2y^2$

We know that any nonzero number divided by itself is 1:

$$\frac{4}{4} = 1 \qquad \frac{3^4}{3^4} = \frac{81}{81} = 1 \qquad \frac{7^5}{7^5} = 1$$

In general, for $x \neq 0$ and n a positive integer:

$$\frac{x^n}{x^n} = 1$$

Can we apply the rule for the division of powers with like bases to these examples?

$$\frac{4}{4} = \frac{2^2}{2^2} = 2^{2-2} = 2^0 \qquad \frac{3^4}{3^4} = 3^{4-4} = 3^0 \qquad \frac{7^5}{7^5} = 7^{5-5} = 7^0$$

In general, for $x \neq 0$ and n a positive integer:

$$\frac{x^n}{x^n} = x^{n-n} = x^0$$

$\frac{10}{10} = 1$

$\frac{2345}{2345} = 1$

$\frac{x^n}{x^n} = 1$

DEFINITION

If $x \neq 0, x^0 = 1$.

$$x^{-2} = \frac{1}{x^2}$$

Proof: $\frac{x^5}{x^8} = x^{-3}$

Alt: $\frac{x^5}{x^8} = \frac{xxxxx}{xxxxxxxx} = \frac{1}{x^3}$

$$x^{-3} = \frac{1}{x^3}$$

Ex: $\left(\frac{x}{y}\right)^{-2} = \frac{x^{-2}}{y^{-2}} = \frac{y^2}{x^2} = \left(\frac{y}{x}\right)^2$

Fractions to negative powers can be flipped and then change negative to positive

HW check:

3) x^7

5) x^4

7) x^{10}

9) 10^6

11) x^6y^3

13) $-9x^6$

15) x^5y

17) x^8y^{10}

19) $\frac{(4x)^3}{4x^3} = \frac{4^3x^3}{4x^3} = 4^2 = \boxed{16}$

21) $\frac{-x^4y^6}{(-x^3y^4)} = \boxed{xy^2}$

23) $\frac{x^2(y^3z)^3}{(x^2y)^2z} = \frac{x^2y^9z^3}{x^4y^2z^1} = \boxed{\frac{y^7z^2}{x^2}}$

25) $\frac{4(ab)^2c^5}{abc} = \frac{4a^2b^2c^5}{abc} = \boxed{4abc^4}$

27) $(8)^3 = 2^n$

$(2^3)^3 = 2^n$

$2^9 = 2^n$

$\boxed{9 = n}$